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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,896	08/20/2003	Nobuo Aoi	740819-1033	4663

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EXAMINER	
OLSEN, ALLAN W	
ART UNIT	PAPER NUMBER
1763	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/643,896	AOI, NOBUO	
	Examiner	Art Unit	
	Allan Olsen	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7 and 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7 and 8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 09/492,841.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,981,398 issued to Tsai et al. (hereinafter, Tsai).

Tsai teaches etching an organic-inorganic hybrid film containing an organic component and a silica component by using plasma derived from an etching gas containing a hydrogen fluoride and an inert sputtering gas, not limited to Ar.

The following excerpts from column 6, line 45 - column 7, line 8, pertain to the organic-inorganic hybrid nature of the layer Tsai is etching.

With respect to the blanket hard mask layer **14**, within the preferred embodiments of the present invention, the blanket hard mask layer **14** is formed from a material selected from the group consisting of silsesquioxane spin-on-glass (SOG) materials and amorphous carbon materials. Silsesquioxane spin-on-glass (SOG) materials are alkoxysilanes characterized by the general formula $(R1)_xSi(OR2)_{(4-x)}$, where: (1) x equals 1 or 2; (2) R1 typically includes at least one radical selected from the group including but not limited to hydrogen radical, carbon bonded hydrocarbon radical and carbon bonded fluorocarbon radical, but not an oxygen bonded radical; and (3) OR2 is an oxygen bonded alkoxide radical, typically but not exclusively methoxide radical or ethoxide radical. Within the preferred embodiments of the present invention, preferred silsesquioxane spin-on-glass (SOG) materials include trialkoxysilanes $(H—Si(OR2)_3)$, methyltrialkoxysilanes $(CH_3—Si(OR2)_3)$ and trifluoromethyltrialkoxysilanes $(CF_3—Si(OR2)_3)$.

Within the preferred embodiments of the present invention, the blanket hard mask layer **14** when formed of a silsesquioxane spin-on-glass (SOG) material is formed employing spincoating and thermal curing methods as are conventional in the art of microelectronics fabrication. Such methods typically employ thermal curing at a temperature of from about 250 to about 400 degrees centigrade to fully condense the alkoxide functionality of the silsesquioxane spin-on-glass (SOG) material, while leaving the silicon-hydrogen or silicon-carbon bond intact.

The following excerpt from column 8 (lines 44-54) pertains to Tsai teaching the use of plasma derived from hydrogen fluoride and an inert sputtering gas.

> Within the preferred embodiments of the present invention when the blanket hard mask layer is formed employing a silsesquioxane spin-on-glass (SOG) material, the first plasma **18** preferably employs a fluorine containing etchant gas composition comprising: (1) at least one fluorine containing etchant gas selected from the group including but not limited to perluorocarbons of no greater than three carbon atoms, hydrofluorocarbons of no greater than three carbon atoms, fluorine, hydrogen fluoride, nitrogen trifluoride and sulfur hexafluoride; and (2) an inert sputtering gas such as but not limited to argon.

In the following excerpt from column 9, lines 56-57, Tsai teaches that N_2 is an inert sputtering gas.

> (3) an inert sputtering gas such as but not limited to argon or nitrogen.

Tsai does not explicitly teach etching an organic-inorganic hybrid film containing an organic component and a silica component by using plasma derived from hydrogen fluoride and N_2.

It would have been obvious to one skilled in the art to etch the organic-inorganic hybrid layer of Tsai with plasma derived from hydrogen fluoride and N_2 because Tsai teaches using plasma derived from hydrogen fluoride and an inert sputtering gas and Tsai teaches that N_2 is an inert sputtering gas.

Response to Arguments

Applicant's arguments filed November 8, 2006, have been fully considered but they are not persuasive.

Applicant argues: the N_2 gas...of Tsai et al. is nothing more than a carrier gas and does not contribute to the etching as is the case in accordance with Applicant's claimed invention.

The examiner notes that, contrary to applicant's assertion, Tsai et al. teach the inert carrier gas **does** contribute to etching. As noted in applicant's remarks (page 3, line 7 of last paragraph), Tsai teaches the inert gas contributes to etching process by way of sputtering. Additionally, claim 7 recites, in part: "An etching method...using a plasma derived from an etching gas containing a N2 gas and a hydrogen fluoride gas." This is exactly what Tsai et al teach. Even if the N_2 of Tsai did not contribute to the etching, there is nothing in the instant claims that addresses the particular role or function of the various components of the plasma gas.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Allan Olsen
Primary Examiner
Art Unit 1763